

Hall Effect Thruster for High Power Solar Electric Propulsion Technology Demonstration, Phase I

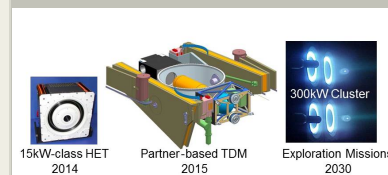
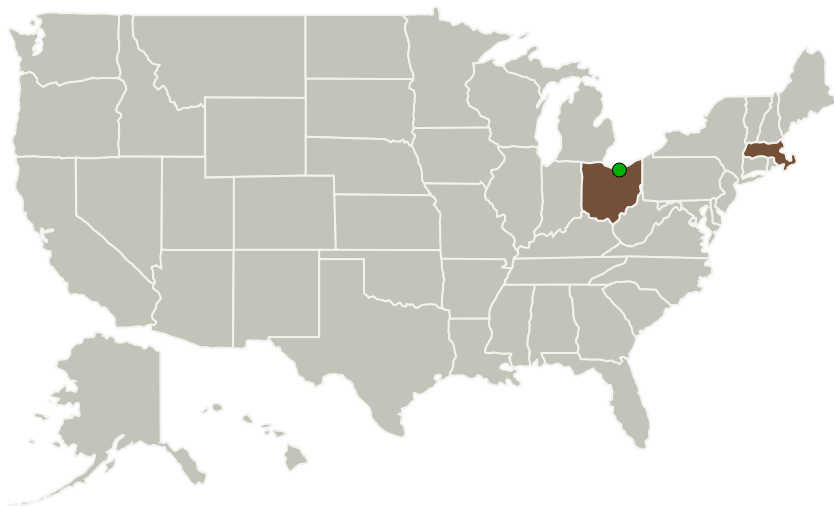
Completed Technology Project (2013 - 2013)



Project Introduction

Busek proposes to develop a flight version of a high power Hall Effect thruster. While numerous high power Hall Effect thrusters have been demonstrated in the laboratory, no flight qualified options exist. The baseline thruster would be tentatively sized at the 15kW power level. Busek proposes to work with NASA to improve upon laboratory designs by incorporating both NASA and Busek unique HET product knowledge. Specific features to be implemented include the use of Hiperc magnetic alloy, improved magnet field distribution using magnetic shielding, high temperature magnet coils and an advanced propellant distribution methodology. Particular attention will be paid to thruster lifetime through a combination of magnetic modeling and erosion analysis using the JPL developed Hall-2DE code. In Phase I, we will prepare a detailed engineering design of the baseline thruster Using internal funds and therefore at no cost to the Phase I effort, Busek will procure the Hiperc raw material for the thruster, have it forged to rough dimensions, heat treated and samples sent to an outside laboratory for magnetic property characterization. This material will be held in inventory to support the thruster build in Phase II. ULA will provide at no cost to NASA engineering support by performing a top level assessment and preliminary system engineering for incorporating a 30kW propulsion module (with two 15kW thrusters) with the MegaFlex and RollOut solar array onto the ESPA. In Phase II we will build and conduct performance and environmental testing of the thruster to raise the maturity level to TRL 6 at the end of the Phase II program.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
Busek Company, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Natick, Massachusetts
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations

Massachusetts	Ohio
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Project Transitions

**May 2013:** Project Start**November 2013:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140373>)

Images

**Project Image**

Hall Effect Thruster for High Power
Solar Electric Propulsion
Technology Demonstration
(<https://techport.nasa.gov/image/133066>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Busek Company, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Vlad Hruby

Co-Investigator:

Vlad Hruby

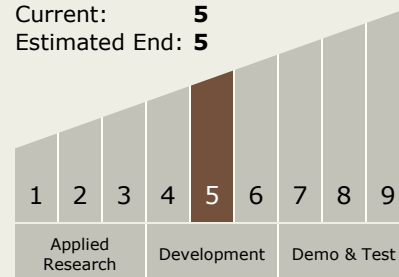
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Technology Maturity (TRL)

Start: 5
Current: 5
Estimated End: 5



Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.2 Electric Space Propulsion
 - └ TX01.2.2 Electrostatic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System